

OFFICIAL JOURNAL OF
THE MUSHROOM GROWERS'
ASSOCIATION

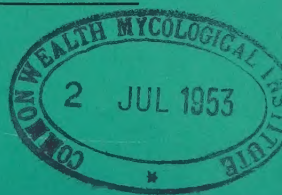
MGA

BULLETIN

JULY, 1953 NUMBER 43

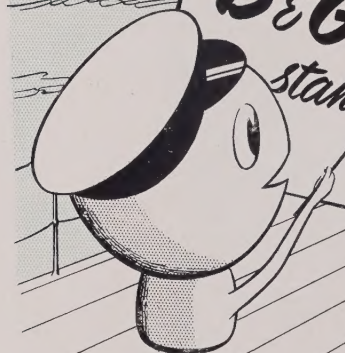
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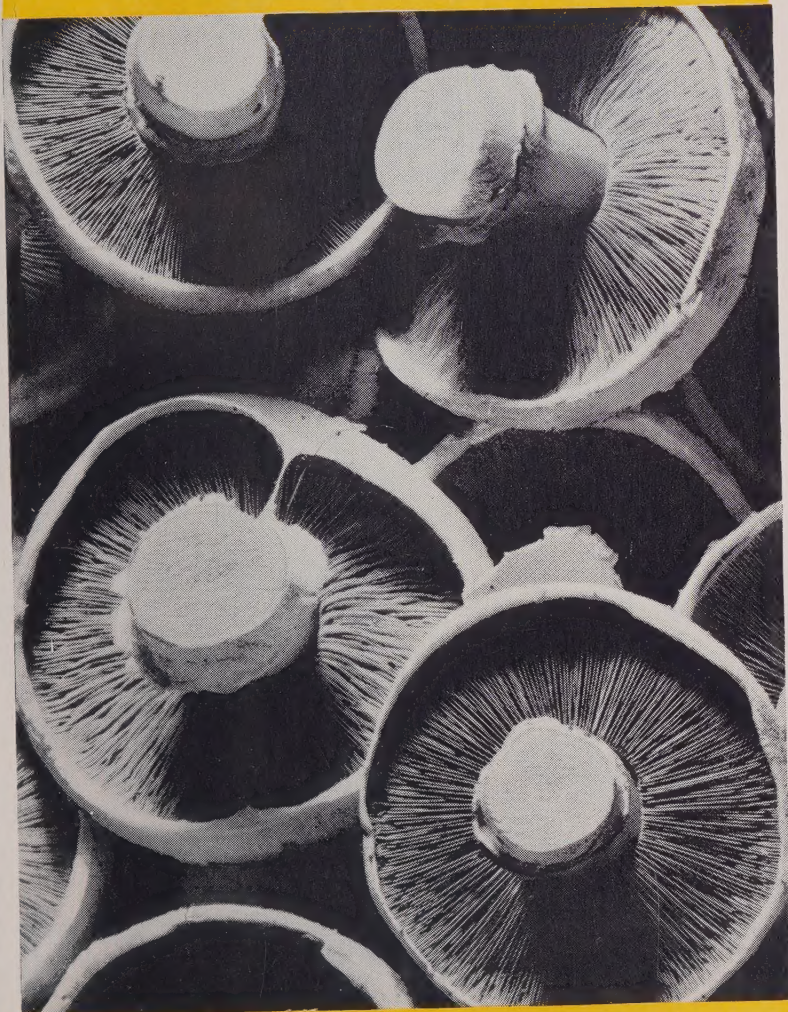
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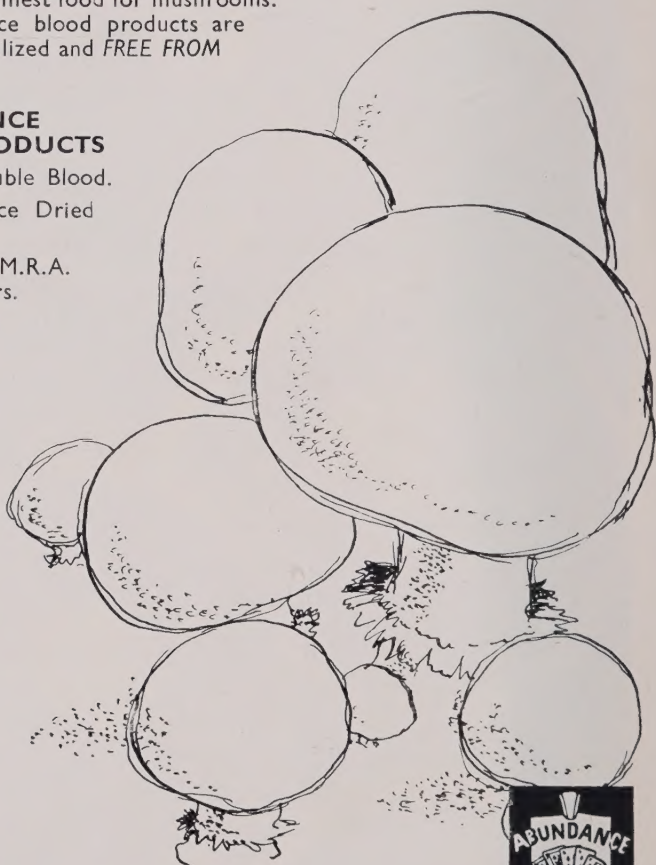
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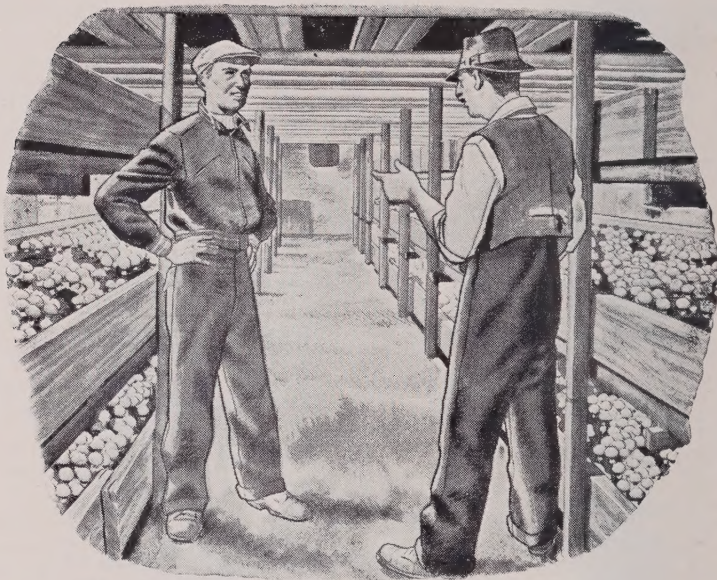
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EDITORIAL**Publicity Wanted?**

Two letters in this issue ask for more publicity for mushrooms. Both suggest the printing of slogans on the underside of our chip covers, which was one of several inexpensive ideas put before the Simons Publicity Sub-Committee two years ago.

It is nonsense to say that any form of publicity is too expensive for the MGA to tackle. Letters and articles in newspapers and magazines cost nothing, for example. I have been publicising our crop ever since the War ended in 1945, and have in fact received a modest payment for some of my articles.

Every now and then, as I mentioned in Bulletin 29, members slip some helpful propaganda into their interviews with local newspapers. Some of us have extolled the virtues of the mushroom to Rotary Clubs, Toc H and Women's Institutes.

Bulletin 25 carried a reprint of an article in the *Fruit Trades' Journal* which suggested retailers would be pleased to present their mushroom customers with recipe leaflets. We had Philip Harben's articles made up in leaflet form for this purpose—but only a handful of members bought them.

Henry Haynes urged us at our Mushroom Lunch nearly two years ago to stage a Mushroom Week in some big city, and Harrogate has since been mentioned as a starting point, coincident with our two-day activities at the end of September. Is anyone interested? Not on your life!

A display of mushrooms growing in trays excited much interest at the Chelsea Show, in May. Who was responsible? The Bradford Fertilizer Co. (not growers).

In Bulletin 26 we published a gay and striking two-colour display bill. We could have had them in 5,000 retailers' windows at a cost of 1½d. each. I believe two members were interested, but I can't remember the other fellow's name.

We persuade a world authority to collect mushroom recipes from all over the world, and with a brilliant firm of young publishers we hold a Reception in the Wine & Food Society's Rooms in London, with André Simon, Sir Compton Mackenzie and a crush of journalists. The subsequent reviews provided invaluable publicity in all the feminine and home Journals—but hardly a soul among our members troubled to buy a single copy for their friends—so the Association lost money and its shelves are stacked with unsold copies of *Mushrooms Galore*.

What encouragement is this to the MGA Executive to revive its Publicity Sub-Committee? If you really **want** publicity for mushrooms, you have only to write to our new Secretary **now** and he will convey your wishes to our next meeting, to be held in a fortnight's time.

F.C.A.

PRACTICAL VENTILATION

Of all aspects of mushroom growing, I think compost has received most attention, and ventilation least. This may be because the mushroom grower cannot ignore his compost, but with a bit of luck he can get by with very rough and ready methods of ventilation. Nor is it easy to find a starting point—the elementary facts about ventilation in a form which the growers can use.

A recent book “Woods Practical Guide to Fan Engineering” should do much to fill this gap for those seriously interested in the subject. As the title indicates, it is mainly about fans, their design and use, but it includes much information which is equally useful in considering ventilation by other methods. Some chapters are highly technical and some do not concern us, but others describe the right and wrong ways of ventilating as simply as can be desired or expected in a technical subject. Although it is written and published by a firm of fan engineers the manufacturer’s interest is not thrust at the reader.

Humidity is explained and there are tables giving the relation between humidity, temperature, and moisture content of the air. Methods of calculating air changes, heat gains and losses, and air velocity are described. The design of ventilating systems, size of inlets and outlets, the relative merits of inlet and exhaust fans are well discussed. Another important feature is an account of air cooling by means of water, which can give a useful drop in air temperature without elaborate refrigerating plant. Apparatus for this purpose was described in *MGA Bulletin* 21.

A further chapter describes the measurement of air flow by means of various instruments, which is of interest even though few growers may want to go as deeply into the subject as this in practice, and another deals with air ducts.

Finally there are chapters on the performance of various kinds of fan, choice of a suitable one for particular purposes, and prevention of back-draughts. 32 pages of tables and useful data complete a highly practical book which I have read with interest and shall use for reference when dealing with ventilation problems.

R.L.E.

Woods Practical Guide to Fan Engineering, Co-Editors, W. C. Osborne and C. G. Turner.
Woods of Colchester Ltd. 10/6d.

NEW MGA MEMBERS (APRIL & MAY)

Conroy, P. J., Ltd., Hope Street, Wigan, Lancs.
Geddes, R. C., 1 Scott’s Lane, Shortlands, Kent.
Hampton, J. W., Durris House, Drumoak, Aberdeenshire, Scotland.
Hedge, C. J., 4 Raymond Buildings, Gray’s Inn, London, W.C.
Hill, E. N., Kemps Close, Stoke Gabriel, Totnes, Devon.
Michigan Mushroom Co., Dawn Fresh Products, Niles, Michigan, U.S.A.
Mullard Horticultural Engineering Co. Ltd., Englefield Green, Egham, Surrey.
Stone, Major G. E., Kirby Misperton Hall, Malton, Yorks.
Stuart & Simms, Burstwick, Hull, Yorks.
Walden, R., 7 Richmond Gardens, Southampton, Hants.
Williamson, A. (19) Ltd., Smithfield Market, Birmingham 5.

CHANGE OF ADDRESS

Fraser, R. J., 48 Ashley Road, Aberdeen, Scotland.
Luxmoore, H. B., Snowcap Mushrooms Ltd., Yaxley, Peterborough, Northants.
Wilson, Major D. A., The Steeple, West Camel, Yeovil, Somerset.
(Italics indicate Honorary Membership)

Dr. J. W. SINDEN'S *observations on*

A THEORY OF COMPOSTING

There is not time nor space to develop a full commentary on the theory proposed by Dr. Stoller in the June MGA Bulletin. That several premises are definitely at variance with the facts as we observe them were evident when we discussed further our system of short composting at the international meeting of mushroom research workers in Gembloux, Belgium, in June. Here it will suffice to say that far from suppressing the ammonification of the nitrogen in the pile as Dr. Stoller suggests and reducing the temperatures, we promote these factors and have found that one portion of the process depends on the presence of ammonia and high temperature.

Among specific points that might be briefly questioned is the fallibility of the Inverse Yield—Nitrogen law which carried to its ultimate would lead to the absurdity that the highest yields would be obtained when no nitrogen at all is present. Somewhere there must be a maximum point in the curve which would fall again toward 0 as the nitrogen is still further reduced.

The evidence produced to support this law as applying to mushrooms as well as to support the inverse N : K ratio is too small to be considered as a serious interpretation of the high yields reported by Lambert and by Sinden and Hauser. In his final word on NPK formulation Dr. Stoller says that "in the case of mushrooms and compost the amount of fixed carbon for a specified NPK formulation can be determined" although he calls attention on a previous page to the fact that the formulation for his liquorice root compost is different than that found in manure and "is probably accountable by the fact that the roots contain less readily available C sources than manure". Hence the C availability affects the formulation and no grower would be able to determine in advance what the C availability would be for any specific compost.

We are afraid also that the grower would become confused and a bit wearied trying to interpret the relation of the seven factors plus, etc., which he is expected to record, to the N in the samples he is to send to a laboratory for analysis to the second decimal place. We think the acceptance or rejection of the theory must await research by an erudite scientist equipped with a laboratory and staff capable of making the analyses and controlling the conditions under which mushrooms are grown. It is unfortunate that Dr. Stoller has not done at least preliminary investigation to substantiate his novel thesis, especially as scientists are always averse to doing the experimental work necessary to substantiate other scientists' theories.

In assessing the credit due to a particular man for a development which becomes ultimately accepted by the technical world and associated with his name, it is not enough to hunt for bits of evidence in contemporary or prior reports by other scientists which would seem to anticipate the final end attained. By such a method almost any important

discovery can be credited to a number of workers who may have made chance observations or contributed small stones to the building of the wall. A classic example is the development of Penicillin by Drs. Florey and Fleming as almost every microbiologist had made observations on the antibiotic relation between micro-organisms growing in culture, some appearing in the literature. When several scientists are working on similar lines on a particular research problem it would be remarkable if they did not cross some easily accessible points in the hunt for new information at about the same time.

That one or another such point was crossed first, by one or another investigator, seems to me of far less importance than the persistence of the effort and the attainment of the ultimate goal. Some scientists prefer to publish frequently the intermediate steps in their search, while others wait and publish only the end results often in what appears a simple form though it may be the digest of a long and tortuous study. Its acceptance and usefulness are the better bases of judgment than are the extensive papers and tables by which the exhaustiveness of the investigation might be assessed.

To say that the system of short composting we have developed and which is now accepted procedure in many mushroom plants, big and small, in America and Europe is only a variation of Lambert's procedure and an outgrowth of Stoller's early work in a drum is to ignore the twenty-year long investigation which was going on in our laboratory parallel to the research projects of these latter able scientists. To say that Lambert by stating in 1941 that 250% water is necessary in compost at the beginning has therefore prior claim to the method of composting in 6 to 9 days outside and 2 to 4 in, under very particular conditions, is to reject all the ability of other investigators to make a parallel observation as was, by the way, made in 1936 in the first report on synthetic compost at the Pennsylvania State College. We do not believe that Dr. Lambert would accept credit for the short composting method which has been identified with our name on any such terms as here proposed by Stoller. (*Indeed, Dr. Lambert urged me in 1950 to refer to it as the Sinden method—Editor*).

As a matter of fact, the investigations of both Dr. Lambert and Dr. Stoller centred on one phase of the composting process, namely that occurring at the temperatures near or below 140° F. (60° C.) whereas we soon realized that the changes occurring above that temperature are equally if not more significant, as we discussed at Gembloux, and we are sure the very high yields reported by us at Peterborough and now being realised regularly in several mushroom plants, where 450 to 500 lb. per ton of manure are obtained, is because of the recognition of two significant phases in the process instead of one. The drum process of Stoller and indoor composting of Lambert are concerned with the latter or pasteurizing phase.

We had no intention of taking credit from other investigators by not including an extensive literature review in our report before the meeting at Peterborough. Neither did we feel that one was required as we were reporting a method of composting rather than all the investigation leading up to it. We do think our method unique and we

are sure that its eager acceptance by advanced mushroom growers shows that it is of significant importance in mushroom growing. The effort made in Dr. Stoller's paper to assess exact credit for small points of similarity to other research workers has little scientific value or justification.

In conclusion I should like to recognise besides the scientists whose reports, naturally, contribute to the trend of thought and advance of any study, the help given me at all stages of my research by the often ignored and silent partners, the many mushroom growers who opened their plants to me to study their composting processes and who co-operated in making the new methods work in practical mushroom growing. Particularly should be mentioned John and Ira Yoder and Nick Zema of Butler County Mushroom Farm, William Garzia of Chef Boy-Ar-Dee Division of American Home Foods Co., Dr. and Mrs. Hauser of Hauser Champignonkulturen AG. and the production staff of Michigan Mushroom Company without whose close co-operation and lengthy and patient discussion the commercial usefulness of the method of short composting for mushroom growing would never have been possible.



TASTE AND FLAVOUR

Robert Patterson, former Northern Ireland representative on the MGA Executive, had this note in *The Commercial Grower* of 2nd April: "I heard an unusual remark recently when I visited a small mushroom grower who also keeps poultry on what is known as the deep litter system. He had been trying synthetic compost and when I asked what he thought of it he replied bluntly: 'The mushrooms have no flavour, just like the eggs from those deep litter hens.' I had heard this allegation before that mushrooms from synthetic compost had not the flavour of ordinary mushrooms, so I decided to find out if there was any truth in it. I presented a pound or two of mushrooms grown on synthetic compost to a housewife who I knew was something of an epicure as regards flavours. She assured me later that neither herself nor any of her family had noticed any difference."

J. C. Bauernfeind et al. (Hoffmann-La Roche Inc.), *Food Engg.* 24, (12), 89-92, (1952) have obtained considerable improvement both in colour and flavour of processed mushrooms by the addition of ascorbic acid. In particular the muddy greyness due to heat treatment was largely prevented. Ascorbic acid was added by means of a second soluble-type tablet. Processing time was 20 min. at 250° F., for tin-packed, compared with 23 min. at 240° for glass. Detailed experiments and results are tabulated for the different packs, such as buttons, slices and soups. It is generally concluded that ready-to-serve cooked products from processed mushrooms packed with added ascorbic acid and salt, in either tin or glass, had the flavour of freshly-cooked mushrooms. The use of a salt-ascorbic acid tablet is suggested for long time commercial practice of processing, at the rate of one tablet per 2 oz., or different size tablets for different size packs.

Perfumery & Essential Oil Record, London, February, 1953.

IT IS UNNECESSARY TO PEEL CULTIVATED MUSHROOMS

T. Terence Leach writes: I have always felt that André Simon's recipes (*Mushrooms Galore*) included too many recipes containing the fatal word PEEL, which I am sure tends to put off the Harassed Housewife, who could or would afford the occasional luxury of mushrooms but for that dreadful contemplation of "peeling the wretched things first".

To obviate this and at least instruct the retailer, I have recently been attaching the above sticker to my cardboard covers, and am now wondering whether other growers might think it worthwhile to join in a more united attempt to help or drill the public, and so reap a gradual reward by increased general sales.

Maybe, if the idea was approved, the MGA could sell the stickers to members at cheaper rates than I have so far obtained on my small order for 5,000 at £2 3s. 6d. which of course included the original typesetting.

Raymond Thompson suggests

Our prices have now reached an uncomfortably low level and the outlook for the summer months is very gloomy. To stop the fall we must have mushroom publicity.

"Ah!" you will say, "that costs money. There are the costs of the paper and the printing and the distribution to the retailers. Most growers even look upon a subscription to research as the responsibility of the next man and they will never give a penny to publicity."

But—does not the solution lie on the underside of our mushroom container covers? We have to use cardboard covers for our chips or boxes and the manufacturers will print on them whatever we ask. The distribution to retailers is automatic and all we need are some good slogans for the retailers to display.

Mr. Philip Harben, the Master Cook, has said: "*Mushrooms are the magic wand of good cooking.*" What about that for a start?



ALTERNATE FUNGICIDES, TOO

It is suggested that fungicides used in disease control should be alternated to avoid the possibility of their becoming ineffective after continuous use.

M. L. GATTANI in *Indian Phytopathology*, 4 (1951).

COPPER SULPHATE AS A SELECTIVE FUNGICIDE IN COMPOST

By Miss D. G. GANDY, MRA Microbiologist

In 1949 laboratory experiments on Truffle were started with the object of finding a method of controlling this serious competitor. The method devised consisted of spraying compost with a solution of the chemical being tested, after which it was packed into glass tubes spawned and later inoculated with Truffle ascocarps. A large number of substances having fungicidal or fungistatic properties have been tried and so far the only one which has had the slightest effect has been copper sulphate (CuSO_4). On a number of occasions it completely inhibited the growth of Truffle while at other times it has been a failure.

The first laboratory success with copper sulphate was followed by a test carried out on a commercial farm. Since then a number of other growers have tried copper sulphate and the results have been as variable as those obtained in the laboratory.

The amount of copper sulphate used varies between $\frac{1}{2}$ and 1 lb. per ton of compost. It is dissolved in a suitable amount of water and sprayed or watered on to the compost at the last turn or just prior to filling.

The following results have been obtained by various growers who have tried this method of combating Truffle.

Farm A

Compost was sprayed with a 25% solution of copper sulphate using 1 litre per ton, i.e. .025% of the wet weight of the compost or .075% of the dry weight or .0375% of the water present. The beds were cased with local soil but no mushrooms were produced. It was removed and replaced with imported soil. The crop was a good one, a small amount of Truffle occurring on untreated beds and none on treated ones.

Farm B

Has suffered from Truffle since 1950. Only isolated crops free from infection.

Method: 1 lb. CuSO_4 to 7 cu. yd. of original racing stable manure. Applied during 3rd and last turning. Watered on to compost as it is taken down into the compost turner. Originally used stirrup pump, but a copper watering can was later found more satisfactory. Peak heat treatment normal. Spawn run at 60°. Growth of mycelium normal.

Results: A forecast was made of the attack of Truffle to be expected in each crop and the actual incidence was recorded. Forecast based on an evaluation of three factors: 1. Incidence and severity of attack of previous crop in the house; 2. Whether filling of a particular house coincided with the emptying and cleaning of an infected house; 3. Whether the first 13 weeks from spawning coincided with high summer temperatures.

Farm C

On this farm a section of 2,200 sq. ft. was treated at the rate of $\frac{1}{2}$ lb./ton compost dissolved in $\frac{1}{2}$ -1 gallon of water. Spawned at 65° F. and run for a short time at 70° F. just before casing. The test was

started in July and Truffle was reported to be present in February. No details were given of the severity of the attack.

Farm D

Had patch of Truffle in Spring 1949. Recorded again in 2 houses in March 1952. Severe attacks again in July 1952. When copper sulphate treatment was started 12 houses in succession had developed Truffle. CuSO_4 was applied at $\frac{1}{2}$ lb./ton of manure.

Before treatment: House 6. Truffle dug out 9 weeks after spawning. About 10% of bed area removed. Another $4\frac{1}{2}\%$ of bed area removed 5 weeks later. No more Truffle. 2 lb./sq. ft. House 7. 7 weeks after spawning $2\frac{1}{2}\%$ of area dug up still more found and beds not likely to produce more than $1\frac{1}{2}$ lb./sq. ft.

After treatment: House 2. 3 months after spawning—no Truffle. House 3. 3 months after spawning—no Truffle. House 4. 2 months after spawning—3 small patches of Truffle but no further development. House 5. After 1 month—excellent first flush and very small patch of Truffle.

These results were recorded in October 1952. The quantity of CuSO_4 now used is double the original amount, 0.8 lb./ton compost.

In March 1953 it is reported that the CuSO_4 alone did not control Truffle when the spawn was run at 80° F. for the first few days, so the following procedure is now adopted:—Spawn at 80° F. Temperature maintained at 70—75° F. for 3—4 days after spawning and then dropped to 65° F. until the mycelium grows through the soil when it is further reduced to 60° F.

The houses now being emptied show very slight traces of Truffle.

So far CuSO_4 has been employed mainly in attempts to control Truffle. There is some evidence, however, that it may be of use in the control of Verdigris or Mat Disease.

Farm E

On one farm there were heavy attacks of Verdigris (or Mat?) on nearly all crops from the end of 1951. In addition Truffle developed at the beginning of 1952 and to combat this the compost was treated with CuSO_4 in the usual manner. *Neither Truffle nor mat developed in this house.* Subsequent crops in which the compost was not treated again had heavy infection by Mat (or Verdigris?).

It therefore seems that CuSO_4 may be of use in controlling this disease. However, it must be borne in mind that several fungi can be associated with this condition and CuSO_4 may not be equally effective in all cases.

RESEARCH COSTS MONEY

Have YOU sent a donation to the Yaxley Research Station this year? We have a long way to go to our target of £1,250. The MRA Directors gratefully acknowledge the following sums received during May: Broadham Produce Co. Ltd., £10; G. M. McArthur, £10; Miss E. K. Alexander £4 4s.; A. St. J. Berry, £4 4s.; R. J. Hopkins, £1 1s. Bankers Orders bring the total for month to £39 9s. and for the year to..... **£874 12s.**

The Tray System Condemned

AS OPERATED IN BRITAIN

*With diagrams illustrating efficient and inefficient uses
of the Steam Room*

By **STANLEY MIDDLEBROOK**

THE TRAY SYSTEM, as operated in this country, is inconvenient, untidy, cumbersome and ugly, and has little to commend it in the way of financial improvement over properly managed shelves.

You can in theory get up to six crops a year, but you don't. You can achieve an easier five, but only one or two do. To get four crops a year, which is what most tray growers do, represents inefficiency and is quite innocent of any claim to be an improvement on the Shelf System; and I will add, categorically, that it is easier to get three crops a year on shelves than four in trays.

How can one be so dogmatic? I must be one of the few who are running the two systems side by side in the same type of house, and thus am able to make fair comparisons. To show that I'm not talking through my hat I will tell you that my 1952 tray average was 1.5—1.49 to be precise—in an average of 6½ weeks' cropping. Yet, despite those fair results, I hate trays—and so does my indoor staff.

The present craze for trays started with the Sinden article in a 1947 Bulletin. From this, many people extracted a false impression that mechanization was possible "to an extent never before dreamed of" even on a comparatively small scale. The attractive picture he disclosed referred almost entirely to extremely large farms of the type we don't have over here, but we ignored that point, and there followed a headlong rush into mad conversions.

It is most significant that, according to my information, only five or six American growers are using the genuine Tray System, and they are the very big men who work in millions of square feet, not thousands. A year after his article appeared, Dr. Sinden told us at Leeds that he could not recommend the system to growers in this country as our comparatively small scale would not permit the necessary mechanization which was the essence of the system.

(I ought to explain that I am not concerned here with the utilization of unusual types of building where shelves for obvious reasons are impracticable, such as old mills, large garages, and certain greenhouse layouts.)

Let me deal with several of the alleged advantages of the Tray System.

First, *mechanization*. Conveyors, casing machines, compost packers, etc., have to be used regularly, and on a grand scale, to justify themselves. On our small British scale they frequently lie idle most of the time or, worse still, take as long to rig up and dismantle as the job itself takes by the proved method of manual labour. Besides, shelf growing is equally capable of being mechanized, as America has demonstrated.

Next, *weight per ton of manure*. It is not my experience that trays show any gain here. Taking a shelf house of 1,000 sq. ft. of 7" bed, we use about three tons less compost than for the 1,500 sq. ft. of 4" trays which go into the same size of house.

We are told we can get a *better spawn run* under the "controlled" tray method. The excellent crops produced on shelves by comparison with trays prove that shelf spawn-growth is no worse.

Reduced capital costs. I can't accept this at all, unless you are going to cram so many trays into a house that you seriously depress yields. This is a big question but, when it is considered seriously, ALL the factors should be taken into account. You don't build only growing rooms and steam rooms; you need proportionately more composting space, soil storage, etc. You need an astonishing number of trays and if you are going to invest in a lot of mechanical playthings you want still more money.

Filling and emptying are easier and cheaper. There's an awful lot of extra handling, say what you will. What a turmoil of trays you have when you're filling! I certainly see no saving or easing between composting and casing. If you add casing, transporting and stacking together, and set this against casing shelves, it's a very inconvenient type of house where shelves don't win. Emptying is easier, admittedly, but when compared with concrete shelves, for instance, the advantage is offset by the handling, cleaning, and fiddling transportation of the trays.

Easier to operate all round. I just don't see this. Are picking and watering easier? Of course not. How can it be claimed that *disease and pest control is easier*? It is argued that a diseased tray can be thrown out; but who does throw it out, especially if it is one of the lower ones? Fly control couldn't be easier than on shelves—and you can't see what's going on in trays, hence neglect.

I will conclude with one or two observations. There is a general complaint here that trays produce small mushrooms. (The American canners prefer small mushrooms). It is suggested that the smallness of the mushrooms is due to the low air : bed ratio, and that the solution is to reduce the number of trays in the house. But unless your production per square foot goes up enormously as a result—and to do this you must have a thicker compost (and therefore less square footage?)—you are still further weakening the case for trays. One of the major claims of



Photo: Wakefield Express Series Ltd.

THE AUTHOR LIKES TO SEE WHAT'S GOING ON

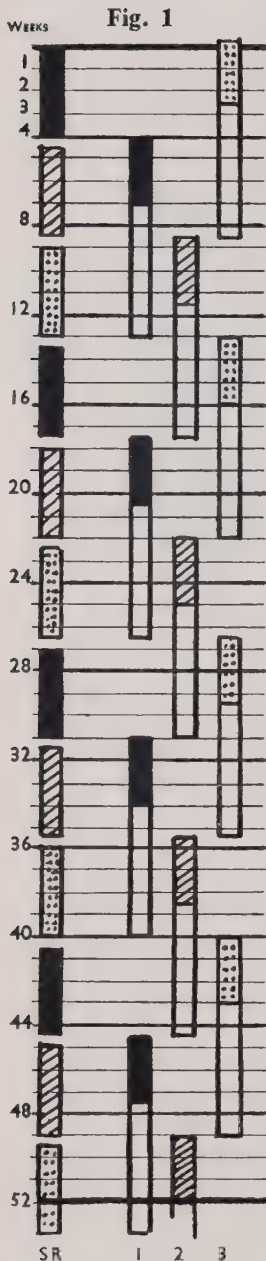
the Tray System is that you can greatly increase your growing area. I am told that Dr. Sinden has reduced his tray area per house almost back to the shelf figure, though I cannot vouch for it.

Apart from the extra time taken in picking a crop of small mushrooms, a sub-standard is being introduced to the markets which may be tending to lower the average price. A small mushroom tastes as good as a big one, but for some reason it can't command the same price.

I have mentioned the difficulty of seeing what goes on in a tray house. This I regard as one of the chief working drawbacks of the System. The "open brickwork" arrangement is a sad mistake. Not only are disease spots hidden and neglected, but it is quite impossible to estimate the daily pick, water requirements, etc., without lengthy detailed examination. This uncertainty adds to the tedium and depression of the System. There is a very strong case for central cantilever supports for trays (an excellent idea also for shelves).

In a word, I regard the Tray System as we apply it in this country on our necessarily poorly mechanized scale as untidy, finicky, unattractive, a source of perpetual headaches, a definite time-waster, and of very doubtful financial benefit even at its most efficient.

NOTE: Interesting diagrams are on pp. 230 and 231



THE TRAY SYSTEM (contd.)

How One Steam Room feeds Three Growing Rooms producing only Four Crops a year

Figs. 1 and 2 show—

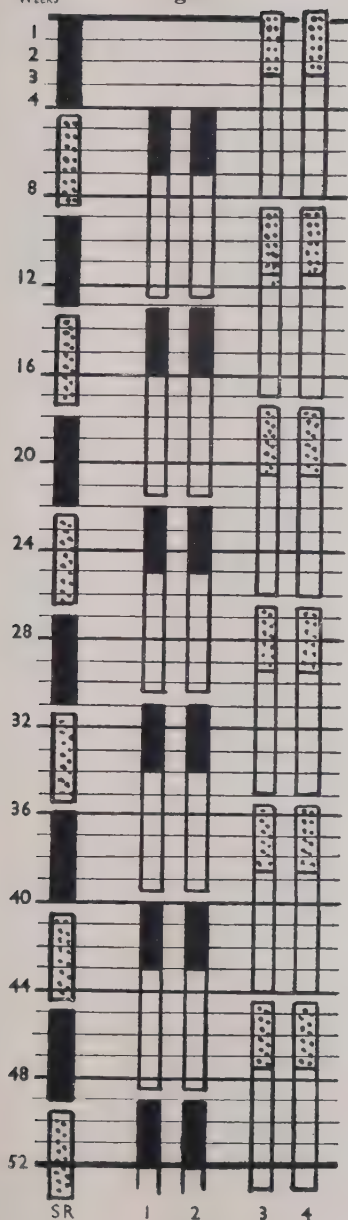
- (a) why four growing rooms are needed to one steam room of the same size, and
- (b) that anything less than $5\frac{1}{2}$ —6 crops per room per year is either a waste of steam room or of growing room, and represents obvious inefficiency.

The horizontal lines read from top to bottom represent one week each. The first column is the Steam Room which is filled 12 times a year, remaining full four weeks each time and leaving half a week for turn round. To fill less than 12 times is obviously a waste of the space. The second, third and fourth columns are the growing rooms fed by the one steam room. The first filling from the steam room (solid black) goes to the first growing room where for the first three weeks the casing to picking period is represented by the same solid black. The remaining 6 weeks of that particular crop are the producing period and represented by the unshaded portion. Similarly the second filling from the steam room goes to No. 2 room (diagonal line shading).

It will be seen that there is a space of four weeks after the six cropping weeks before any one growing room can be refilled from the steam room. It might be argued that the rooms could go on for 10 weeks, but as a six week crop is one of the claims for the Tray System it is clear there is a wastage of four weeks with every crop on this four-a-year basis. Thus to get only four crops a year from a steam room that is working full blast is uneconomical. In this particular instance the steam room could be half the size of the growing rooms, but the wastage per growing crop remains.

WEEKS

Fig. 2



THE TRAY SYSTEM (contd.)

How One Steam Room feeds Four Growing Rooms producing nearly Six Crops a year

In this case the steam room is used exactly as for four crops a year, and is the same size as the growing rooms, so that the steam room fills two growing rooms each time.

It will be seen that the growing rooms in this scheme are cropping for $5\frac{1}{2}$ weeks with half a week for emptying and refilling, but as only one day is really necessary for this turn round they could be allowed to crop practically six weeks. Thus each double batch of rooms crops nearly six times a year. If this rate is not achieved it must be a sign of inefficiency.

It is of course a very tight schedule, but that is the Tray System. Unless it's a severe headache it cannot be efficient.

It should be stated that Figs. 1 and 2 are based on the assumption that trays will contain 4" of compost with which it is not reasonable to expect more than five to six weeks actual cropping. If growers fill trays with 6" or 7" of compost they would expect longer crops and a different picture would be presented, but one of the chief features of the Tray System is alleged to be a saving of compost and a short cropping period. Anything else is bordering on the shelf method and cannot be genuinely referred to as the Tray System. I maintain the Tray System is a waste of time with 4" of compost. It is a criminal waste with 6" or 7".

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claims made for it. It may
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is still producing."

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Proprietor.

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".....We have now been using
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the results obtained which
have been most satisfactory."
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R. J. Hopkins.

Meadway Mushroom Farm,
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30th March, 1953.
".....During the year I think
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makes of spawn in small-scale
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Spawn, and I have not found
one to compare with yours
under my system of growing.
Just as you know I now use
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Spawn....."
A. P. Keens.

Mushroom Farm Ltd.,
Lycombe Road, Chesham,
Bucks.

27th March, 1953.
".....Over the past year we
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than 2 lbs per square foot of
mushrooms packed for market.
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Mushroom Spawn....."
H. R. Fryer,
Director.

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Stanley Middlebrook's Diary

May 9. Our mushroom-eating cat quizzically examined a fine specimen of *Clitopilus cretatus*. Curiosity inevitably led to cannibalism.

May 12. I am staggered sometimes to learn what a simple thing efficiency may be. It can be a small matter like putting a consignee's label on a batch of mushrooms, or merely stating what quantity has been sent. It could even be as elementary as permitting the salesman to know from whom your consignment comes! It's true. Those are examples of negligence on the part of some growers who apparently couldn't care less even about their own interests.

May 16. If you *must* grow cucumbers and if you *must* use synthetic compost for growing mushrooms you might like to make a little extra of the latter and apply it as a top dressing to the former. I'm told it's worth while.

May 18. Is it important just when a peak heat is done or forced? Should it be started artificially immediately after filling or should the compost be allowed to settle in and start heating on its own before artificial heat is put on? These are questions we hope to answer in due course when an existing series of experiments produces results.

May 19. A grower who has gone over to trays "for all time" said idiomatically "I wouldn't be seen dead on a bed." Evidently he hopes to die in *tray*ses.

May 20. At least two firms' representatives have been visibly shocked at my offer to make immediate payment for goods purchased and have instantly treated their shock by giving me a discount for such honourable intentions! A spawn firm, however, who have always had prompt payment on receipt of invoice "Can't give a discount fairness to other growers high overheads" Etc., etc. Very well, the blighters can wait for their money. This is 1953 not 1945. And anyway there are other spawn makers. I must add that, quite unashamedly, this firm did suggest that a note in the Diary to the effect that their spawn was the best obtainable might do a lot of good. For 10% discount—or a year's free supply—I might stoop very low.

May 25. Synthetic compost users have found that standardisation of material does not lead to reduction of cultural variations and problems. Users of so-called synthetic casings are finding the same disappointments. All is not "easier from now on". One of the major problems, I fancy, is control of quality and size. If large mushrooms can be grown in peat mixtures I should like to know how. I do know that if anyone has the secret he's not going to tell me!

May 26. Hot weather and holidays. Phone calls from all markets—"Don't send mushrooms, no demand."

May 30. I suppose there are drawbacks in being a big grower. Some of the Worthing people are so big that they flood their local markets; they swamp London; and they submerge Birmingham, Glasgow, Bristol, Liverpool, Manchester and Leeds. They leave little scope for

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us small fellows. The other day on one of our markets we encountered the competition of some of Worthing's many-citied overflow selling at 2/6d. lb. With agents' commission and long distance carriage, etc., the net return must have been well below production cost. Yes, there are drawbacks. We were selling in the same market at 3/6d. and 4/-lb. net.

June 4. Cold weather, holidays over. Phone calls from all markets—"Send all possible, big demand."

June 5. Thinking over the last three items I wonder how we ever sell anything after say April. Theoretically it should be impossible. When it's hot mushrooms grow rapidly and in great quantity on every farm and in hot weather nobody wants them and the surplus doesn't help. When it's cold they won't grow (and we don't put artificial heat on in June!) and in cold weather there's a demand—hot meals, etc.—and we have none to sell!

June 6. Growers prone to Dactylum will be interested to know that this disease—which is alleged to be more persistent in summer—has almost completely vanished from this farm. Whether it is the coming of summer and the mushroom's triumphant enjoyment of satanic contradictions or perhaps the result of the new Salt treatment I leave to the imagination. If it returns in winter the text books must be re-written.

June 7. Mr. Atkins has handed me a note of one of the items intended for *The Grower* and which the editor seemed not to want. It should have come into the "A" category of Fred. C's "Encyclopædia" in that paper and is entitled "Abnormalities". After discussing the serious aspect of the topic briefly the item concludes "Abnormalities among growers are even more common; some insist upon telling their competitors all their secrets." (Needless to say Mr. Atkins is paying me to include this item here.)

June 8. When we first contacted the manager of the Royal Hall, Harrogate, about our Show he laughed. "Mushrooms?" he said, "You've come to the right place. We can show you how to grow them." So this might well be a feature of the exhibition. I am assured it is all so simple, involving no compost, capital or "credit". All you require is a spartan effort to rise—or stay up till—three in the morning and walk along a certain street near the Hall. "Mushrooms can be picked up all along the pavement for about a quarter of a mile every night in the season," said Mr. Baxter. "And I'll tell you something else. A friend of mine has had three attempts at concreting the yard outside his garage, and each time it is cracked and pushed up by mushrooms. You can't teach us anything."

June 9. Another feature of the Show which I feel will offer (a) little scope for mushroom growers is the fact that the bar will be open all day.

June 11. Visited a grower to-day and saw a sight which gladdened his heart and saddened mine. He had a house where every bed was *completely* covered with mushrooms. When asked how he did it he said "You put the question rather badly. You should ask Why, not How". I said, "Okay, Why?" "Well, you see I've got a secret casing material and I don't want anybody to see it."

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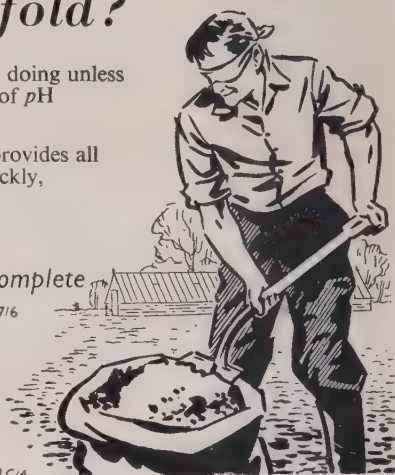
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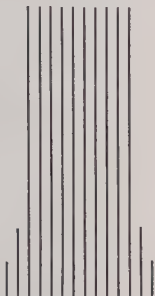
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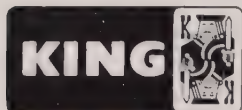
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PEDIGREE GENUINE WHITE FINISH PAINT, in 5 gallon drums 54/6 per gallon. **PINK PRIMING,** very heavy, 5 gallon drums 51/6d. per gallon. **COOKSON & JOHNSON'S GENUINE ENGLISH WHITE LEAD,** in 5 gallon drums 57/6d. gallon, 100 gallon and over 55/- per gallon. Sample with pleasure, delivered 25 miles radius Hackney Warehouse. R. C. DARLINGTON, Hastingwood, Harlow, Essex. 'Phone: Potter Street 138.

TONKIN CANES. Send for new season's Price List Tonkin Canes 4 ft. 6/8 lbs. to 24/26 lbs. Special price for 50-bale lots *ex* Hackney Warehouse. Also Split Chinese Flower Sticks 24 inch 97/- per 5,000 Bale. Cheapest house in the trade for Sundries. R. C. DARLINGTON, Hastingwood, Harlow, Essex.

SMALL ADVERTISEMENTS (continued)

ZINC ETHYLENE-BIS-DITHIOCARBAMATE—"386" PRODUCT. In 1 cwt., $\frac{1}{2}$ cwt., 28 lb. Kegs Free. No less than 7 lb. all at 3/9 per lb. Carriage Forward. R. C. DARLINGTON, Hastingwood, Harlow, Essex.

NEW CONSIGNMENT "386" PEAT moss arrives London Docks early May. Buy it fresh and clean now. R. C. DARLINGTON, Hastingwood, Harlow, Essex.

PURE DRIED GROUND POULTRY MANURE. This pure, natural organic is regularly used by prominent mushroom growing firms. It represents an invaluable *organic* activator for stable manure. Finely and evenly ground, it is convenient and clean to handle and being packed in $\frac{1}{2}$ cwt. sacks, the weight you receive is *guaranteed*. Sample and prices (which vary according to the distance for carriage from our Works) on application. Sole Producers:—THE HAMPSHIRE GUANO CO. LTD., SOBERTON, SOUTHAMPTON. (Estd. 1937). Manufacturers of "Gunos" (Regd.) Brand Fertilisers.

HARROGATE IN SEPTEMBER

SECOND ANNUAL

Mushroom Industry Exhibition

ROYAL HALL, HARROGATE

30th SEPTEMBER, 1953

Plans of Stands and space available are being sent to firms connected with the Industry.

There will be a Grand Display of Produce submitted for competition and award of the MGA, the Mount, the John Thwaites and the Poupart Challenge Cups and other Trophies.

Judging of the Competitions will be at 6 p.m. on Tuesday, 29th September.

Also on Tuesday will be the **MGA Reception and Luncheon, Annual General Meeting** and at 8.0 p.m. a **Civic Reception by the Mayor of Harrogate** for the members, their wives and friends.

Buffets and Bars will be open in the Royal Hall during the run of the Exhibition.

Enquiries should be addressed to:—

THE SECRETARY,

MUSHROOM GROWERS' ASSOCIATION,

YAXLEY, PETERBOROUGH,

who will also supply Schedules for the Competitions.